

Claims

1. A process for improving the efficiency of separation of solid biological matter from the aqueous liquid phase resulting from the acid hydrolysis of a naturally occurring carbohydrate containing substrate characterized by the addition of flocculating agent (s) to the aqueous solids bearing mixture in an effective amount.
2. The process according to claim 1, wherein the aqueous mixture is obtained from hydrolysis of a polysaccharide based plant derived material.
3. The process according to claims 1 or 2, wherein the amount of flocculating agent is in the range of from 0.002 to 1 % by weight, based on the weight of solid matter.
4. A process of producing fermentation product comprising the steps of,
 - (i) hydrolysing a particulate polysaccharide based plant derived material in an acid medium, and thereby forming an aqueous mixture comprising dissolved sugar and solid matter,
 - (ii) subjecting the aqueous mixture to one or more separation stages in which solid matter are removed from the aqueous phase,
 - (iii) adjusting the pH of the obtained aqueous phase to a pH of at least 4,
 - (iv) fermenting the dissolved sugars of the aqueous phase by a microorganism to produce a fermentation product,
 - (v) isolating the fermentation product,characterised in that in at least one separation stage in step (ii) a flocculating agent is added to the aqueous mixture in an effective amount.
5. A process according to claim 4 in which the plant derived material comprises components selected from the group consisting of herbaceous biomass, softwood biomass, hardwood biomass, sewage sludge, paper mill sludge and the biomass fraction of municipal solid waste.

6. A process according to any of claims 4 to 5 in which the solid matter are subjected to at least one wash cycle, which wash cycle comprises washing the solid matter and then repeating stages (i) and (ii).
7. A process according to claims 1 to 6 in which the flocculating agent is selected from the group consisting of water-soluble or water swellable natural, semi-natural and synthetic polymers.
8. A process according to claim 7 in which the polymer is selected from the group consisting of polyacrylate salts, polyacrylamide, copolymers of acrylamide with (meth) acrylic acid or salts thereof, copolymers derived from acrylamide and dialkylaminoalkyl (meth)acrylate acid salt or quaternary ammonium salts, polymers derived from diallyldimethyl ammonium chloride, polyamines and polyethylene imines.
9. A process according to any of claims 1 to 6 in which the flocculating agent is a charged microparticulate material.
10. A process according to claim 9 in which the charged microparticulate material is selected from the group consisting of swellable clays, anionic, cationic or amphoteric microparticulate silica based materials and organic cross-linked polymeric microparticles.
11. A process according to any of claims 1 to 6 in which the flocculating agent is a water soluble or water-swellable polymer and a charged microparticulate material.